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This invention provides a public telephone system including a plurality of public telephone base stations (10), each being connected to a telephone network (12), and a multiplicity of cordless telephones (20), each being capable of communicating with the telephone network (12) via any one of the plurality of base stations (10) which is within a range of distances which enables such communication to occur in a wireless manner. The system and its method of operation are characterized in that the cordless telephone (20) need not identify itself to the telephone network (12) and the telephone network (12) need not participate in billing, other than by debiting a payment facility associated with the cordless telephone (20). The communication between the base station and the cordless telephone (20) may avoid use of frequencies and transmission power levels which require licensing.

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WIRELESS PUBLIC TELEPHONE WITH DIRECT BILLING OF USER CREDIT OR DEBIT CARD

The present invention relates to telephony in general and more particularly to public telephones.

Public telephones are well known in most parts of the world. Conventional public telephones have fixed locations and require that a user be physically present at the fixed location in order to use the telephone. Often, the physical location of the telephone is inconvenient for the user to get to and is in an unsuitable environment, in terms of background noise, exposure to the elements, vandalism or personal safety. For the foregoing reasons, many public telephones are uneconomical to the operator due to low utilization coupled with high installation and maintenance costs.

The relatively recent mass acceptance of mobile telephones, including PCS and cellular telephones, has somewhat reduced the usage of conventional public telephones. Conventional mobile telephone networks, such as PCS and cellular public telephone networks, employ wavelengths and transmission power levels which are regulated and require licenses. Conventional mobile telephone networks provide billing functionality through the network which is a substantial cost factor both for the operator and the user.

U.S. Patent 5,327,482 describes a public cordless telephone system which employs a base station having an associated charger for mobile units, called branch units, and which includes a theft prevention function. This system employs an identification signal detecting circuit for collating an identification signal determined by a combination of the base unit and the branch unit.

U.S. Patent 5,359,182 describes a wireless telephone debit card system and method. The debit

card used in this system requires an identification number or personal access number.

The present invention seeks to provide a public telephone system having enhanced flexibility in that it employs cordless telephones. The public telephone system of the present invention employs preferably does not include any billing infrastructure and is merely operative to debit credit cards or debit cards associated with the cordless telephones.

Preferably, but not necessarily, the public telephone system does not require the use of regulated frequencies and/or transmission power levels. Unlike the prior art, the system of the present invention does not require any identification number for a cordless telephone or for a debit card.

It is noted that throughout the specification and claims the term "cordless telephone" encompasses any wireless communication device, for example, a cordless telephone, a cellular telephone, a pager, or a walkie-talkie device.

There is thus provided in accordance with a preferred embodiment of the present invention a public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network and a multiplicity of cordless telephones, each being capable of communicating with any nearby one of the plurality of base stations in a wireless manner, wherein identification of the identity of the cordless telephone to the telephone network is not required.

Preferably, the public telephone base station participates in billing by billing a credit facility associated with a cordless telephone.

There is also provided in accordance with a preferred embodiment of the present invention a public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone

network and a multiplicity of cordless telephones, each being capable of communicating with any nearby one of the plurality of base stations in a wireless manner which does not utilize frequencies and/or transmission power levels which requiring licensing.

In accordance with a preferred embodiment of the present invention, the telephone base station is equipped to provide telephone connections to a plurality of cordless telephones simultaneously in a multi-channel arrangement.

The telephone base station may be associated with or mounted within a conventional fixed public telephone or alternatively need not be associated with a fixed public telephone.

The telephone base station may employ dedicated lines or may time share lines with other users at time when such lines are not needed.

It is a particular feature of the present invention that a given cordless telephone is not restricted to use with a given base station.

Each cordless telephone preferably includes a credit or debit card acceptor which enables billing to be effected using such a credit card. Preferably, the base station does not participate in billing, other than by debiting a debit card.

Normally the cordless telephone does not accept incoming calls.

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified block diagram illustration of a public telephone system constructed and operative in accordance with a preferred embodiment of the present invention;

Figs. 2A and 2B are simplified illustra-

tions of two alternative embodiments of a base station associated with a conventional public telephone;

Fig. 3 is a simplified illustration of a base station associated with a PABX in a time-shared arrangement;

Fig. 4 is a simplified illustration of a base station associated with an ordinary telephone set in a time-shared arrangement; and

Fig. 5 is a simplified block diagram illustration of a cordless telephone useful in accordance with a preferred embodiment of the present invention.

Reference is now made to Fig. 1, which is a simplified block diagram illustration of a public telephone system constructed and operative in accordance with a preferred embodiment of the present invention. The system preferably includes a plurality of base stations 10, each of which is connected, in a conventional manner, to a telephone network 12.

As will be described hereinbelow, the base stations 10 may be stand-alone base stations, as indicated by reference numeral 14, base stations associated with a conventional public telephone, as indicated by reference numeral 16, or base stations 18 associated, on a time-shared basis with other non-public users, such as via a user's PABX.

A multiplicity of user-carried cordless telephones 20 are provided and each may be used with any of the base stations 10 which is sufficiently close to the base station so that communication can be established. Preferably, but not necessarily frequencies and/or transmission power levels which do not require licensing are employed. Preferable frequencies are ISM frequencies and power levels. Preferably secure SPSP or FFH links are employed. Normally the cordless telephone must be within a suitable distance from a base station 10 in order to effect communication.

In accordance with a preferred embodiment of the invention, the cordless telephones 20 are maintained in the possession of individual users, who can use them to make public telephone calls whenever they are within a communicable distance from a base station. Preferably, no billing is involved, since all charges are deducted from a debit card associated with each cordless telephone, which preferably includes a credit or debit card acceptor.

Various types of base stations may be provided. Referring now to Fig. 2A, there is seen a single line base station 30 and a conventional public telephone 32 both connected via a time sharing switch 34 via a single telephone line 36 with a public switched telephone network 38. In practice, the telephone line is available to the either the conventional public telephone 32 or to a wireless telephone 39 operating via the base station 30 according to which of the two first seizes the line.

Fig. 2B illustrates a multi-channel base station 40 and a conventional public telephone 42 both associated with a public switched telephone network 44 via a multiplexed line 46 having suitable pair gain multiplexers 48 and 50 associated therewith at both ends thereof, thus providing multiple line functionality and simultaneous operation of both the conventional public telephone 42 and multiple wireless telephones 52 via the base station 40.

Referring now to Fig. 3, there is seen a base station 60 associated with a PABX 62 in a time-shared arrangement. Base station 60 is allocated a line or lines subject to availability, based on having a lower priority than the other subscribers served by the PABX. In this manner, excess line capacity of the PABX 62 may be employed by one or more wireless telephones 64 operating via the base station 60.

Fig. 4 illustrates a preferred configuration of a base station which may be associated with a PABX in a time-shared arrangement such as that illustrated in Fig. 3. The base station preferably comprises a transceiver 70 and associated pulse meter and credit controller 72 which are interposed between the PABX and cordless telephones 74.

In the illustrated embodiment of the invention, cordless telephones 74 may generally only be used for outgoing calls. A conventional paging network 76 may be provided to notify a user of incoming messages. A conventional pager 78 may be incorporated into a cordless telephone 74, as illustrated.

Reference is now made to Fig. 5, which is a simplified block diagram illustration of a cordless telephone 80 useful in accordance with a preferred embodiment of the present invention. The cordless telephone preferably incorporates a transceiver 82, a controller 84 and a free channel display 86 indicating available channel status. Preferably, the cordless telephone 80 also incorporates a credit card acceptor 88 and a credit status display 90.

It will be appreciated by persons skilled in the art that the present invention is not limited to what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims which follow:

C L A I M S

1. A public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network and a multiplicity of cordless telephones, each being capable of communicating with any nearby one of the plurality of base stations in a wireless manner, wherein identification of the identity of a cordless telephone to said public telephone base station is not required.
2. A public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network; and a multiplicity of cordless telephones, each being capable of communicating with said telephone network via any one of the plurality of base stations which is within a range of distances which enables such communication to occur in a wireless manner which does not utilize frequencies and transmission power levels which requiring licensing.
3. A public telephone system according to claim 1 and wherein the base station bills a payment facility associated with a cordless telephone.
4. A public telephone system according to claim 2 and wherein at least some of said multiplicity of cordless telephones each are associated with a payment facility.
5. A public telephone system according to any of the preceding claims and wherein at least some of said plurality of telephone base stations are equipped to provide telephone connections with a plurality of cord-

less telephones simultaneously.

6. A public telephone system according to any of the preceding claims and wherein at least one of said plurality of telephone base stations are associated with a conventional fixed public telephone.

7. A public telephone system according to any of the preceding claims and wherein at least one of said plurality of telephone base stations are not associated with a conventional fixed public telephone.

8. A public telephone system according to any of the preceding claims and wherein at least one of said plurality of telephone base stations employs dedicated lines.

9. A public telephone system according to any of the preceding claims and wherein at least one of said plurality of telephone base stations shares lines with non-public telephone users at times when such lines are not needed by said non-public telephone users.

10. A public telephone system according to any of the preceding claims and wherein at least some of said multiplicity of cordless telephones are not restricted to use with a given base station.

11. A public telephone system according to any of the preceding claims and wherein at least some of said multiplicity of cordless telephones include a credit or debit card acceptor which enables billing to be effected.

12. A public telephone system according to any of the preceding claims and wherein at least some of said plurality of base stations do not participate in billing,

other than by debiting a debit card.

13. A public telephone system according to any of the preceding claims and wherein said multiplicity of cordless telephones are not restricted to use with an identification number.

14. A public telephone system according to claim 11 and wherein a debit card which communicates with said debit card acceptor is not restricted to use with an identification number.

15. For use in a public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network, a cordless telephone, being capable of communicating with said telephone network via any one of the plurality of base stations which is within a range of distances which enables such communication to occur in a wireless manner which does not utilize frequencies and transmission power levels which requiring licensing.

16. A cordless telephone according to claim 13 and also comprising a payment facility.

17. A cordless telephone according to claim 14 and wherein said payment facility comprises a card acceptor.

18. For use in a public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network, a cordless telephone, being capable of communicating with said telephone network via any one of the plurality of base stations which is within a range of distances which enables such communication to occur in a wireless manner, the cordless telephone not providing an identification number associ-

ated with the telephone to a base station in order to operate therewith.

19. A method for operating public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network and a multiplicity of cordless telephones, each being capable of communicating with any nearby one of the plurality of base stations in a wireless manner, the method being characterized in that identification of the identity of a cordless telephone to said public telephone base station is not required.

20. A method for operating public telephone system comprising a plurality of public telephone base stations, each being connected to a telephone network; and a multiplicity of cordless telephones, each being capable of communicating with said telephone network via any one of the plurality of base stations which is within a range of distances which enables such communication to occur in a wireless manner, the method being characterized in it does not employ frequencies and transmission power levels which requiring licensing.

21. A method according to claim 19 and wherein the base station bills a payment facility associated with a cordless telephone.

22. A method according to claim 20 and wherein at least some of said multiplicity of cordless telephones each are associated with a payment facility.

23. A method according to any of the preceding claims 19 - 22 and wherein at least some of said plurality of telephone base stations provide telephone connections with a plurality of cordless telephones simultane-

ously.

24. A method according to any of the preceding claims 19 - 23 wherein at least one of said plurality of telephone base stations are associated with a conventional fixed public telephone.

25. A method according to any of the preceding claims 19 - 24 and wherein at least one of said plurality of telephone base stations are not associated with a conventional fixed public telephone.

26. A method according to any of the preceding claims 19 - 25 and wherein at least one of said plurality of telephone base stations employs dedicated lines.

27. A method according to any of the preceding claims 19 - 26 and wherein at least one of said plurality of telephone base stations shares lines with non-public telephone users at times when such lines are not needed by said non-public telephone users.

28. A method according to any of the preceding claims 19 - 27 and wherein at least some of said multiplicity of cordless telephones are not restricted to use with a given base station.

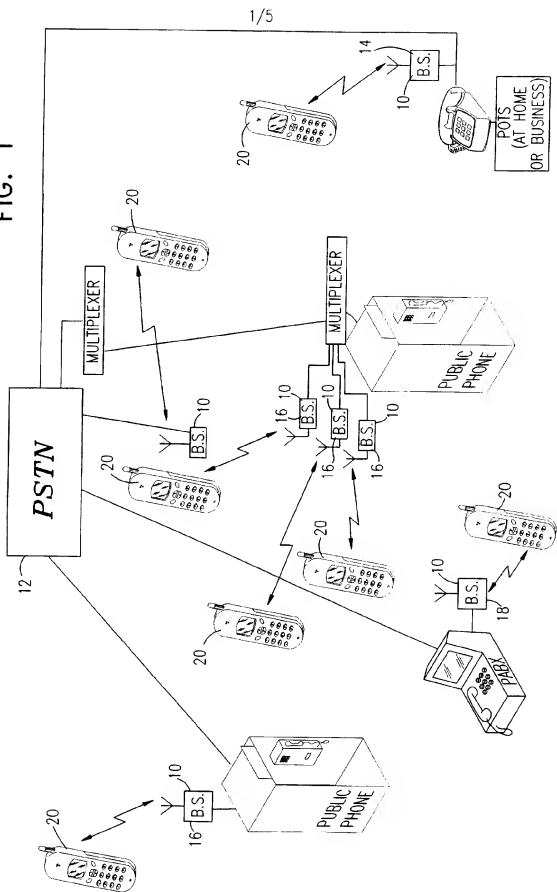
29. A method according to any of the preceding claims 19 - 28 and wherein at least some of said multiplicity of cordless telephones employ a credit or debit card acceptor which enables billing to be effected.

30. A method according to any of the preceding claims 19 - 29 and wherein at least some of said plurality of base stations do not participate in billing, other than by debiting a debit card.

31. A method according to any of the preceding claims 19 - 30 and wherein said multiplicity of cordless telephones are not restricted to use with an identification number.

32. A method according to claim 31 and wherein a debit card which communicates with said debit card acceptor is not restricted to use with an identification number.

FIG. 1



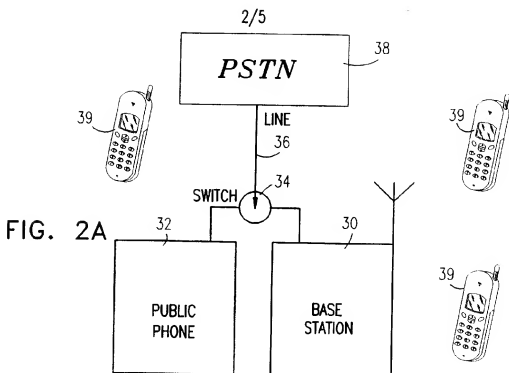
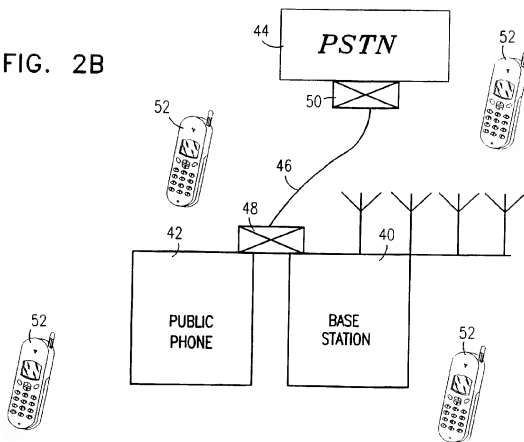
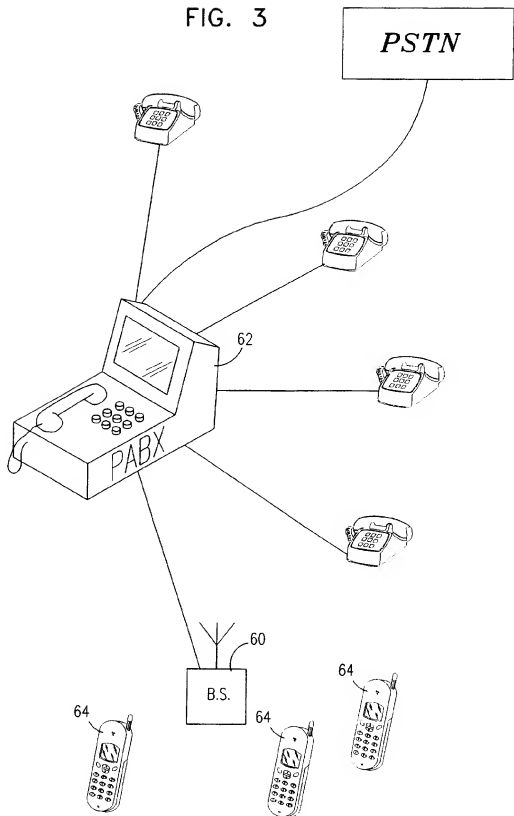


FIG. 2B



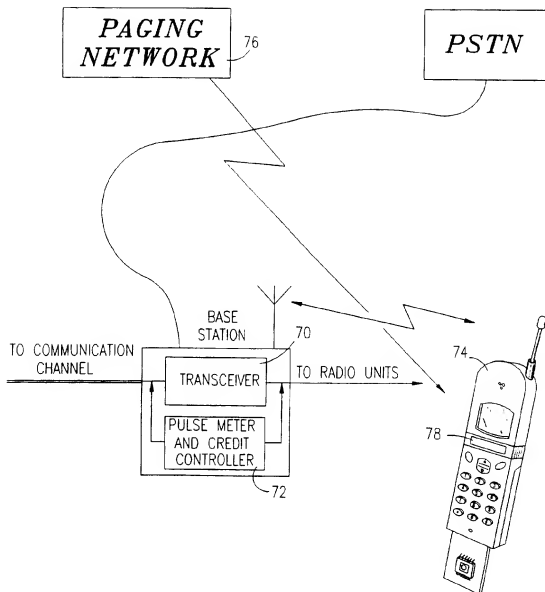
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FIG. 3

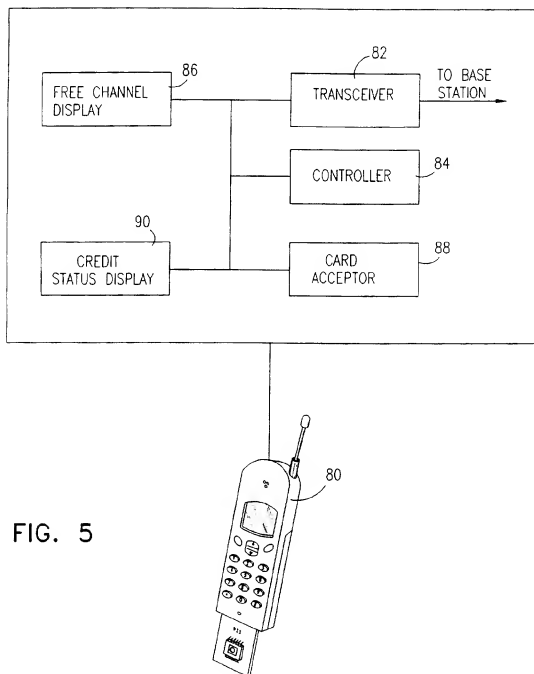


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FIG. 4



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL97/00297

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04M 11/00

US CL : 455/465

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/465, 406, 407, 462, 551, 558; 379/357

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,138,650 A (STAHL et al.) 11 August 1992, figs. 1-3, abstract, col. 2: lines 1-14, col. 3: lines 16-63.	1-4, 15, 18-22
X	US 4,845,740 A (TOKUYAMA et al.) 04 July 1989, figs. 1, fig. 2: refs. 201-202, abstract, col. 1: lines 48-68, col. 2: lines 1-6.	1, 3, 19, 21
X	US 5,388,148 A (SEIDERMAN) 07 February 1995, figs. 1, 4, and 6, abstract, col. 1: lines 60-68, col. 2: lines 1-3 and 10-15, col. 4: lines 14-54.	1-4, 15, 18-22
A,P	US 5,577,101 A (B*OHM) 19 November 1996, fig. 1, abstract, col. 2: lines 1-33.	1-4, 15, 18-22

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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